

WHAT IS CLAIMED IS:

1. A rotary electric machine comprising:

an armature core having a predetermined number of slots;

an armature coil having a predetermined number of lower layer coils and upper layer coils installed in double layers in each of the slots against the armature core, the lower layer coils and the upper layer coils each having a straight portion and an arm portion bent perpendicularly from the straight portion;

an insulating plate interposed for insulation between the arm portion of the lower layer coil and the arm portion of the upper layer coil which are provided axially outside of an axial end surface of the armature core;

a cylindrical body circularly surrounding an outer periphery of a coil end portion of the upper layer coil, the coil end portion locating axially outside of the axial end surface of the armature core and excluding the arm portion of the upper layer coil; and

a resin insulator filled in an inner groove among adjacent coil end portions in a peripheral direction, the axial end surface of the armature core and the insulating plate.

2. The rotary electric machine as in claim 1, wherein the cylindrical body is fixed to the armature core with the resin insulator.

3. The rotary electric machine as in claim 1, wherein the arm portions of the upper layer coils construct commutator segments of a commutator.

4. The rotary electric machine as in claim 1, wherein the cylindrical

body is mounted without protruding in an axial direction from a surface of the insulating plate which faces the arm portion of the upper layer coil.

5. The rotary electric machine as in claim 4, wherein the resin insulator is provided only underneath the cylindrical body.

6. The rotary electric machine as in claim 1, wherein the cylindrical body is fixed in accordance with hardening of resin which is filled to provide the resin insulator.

7. The rotary electric machine as in claim 1, wherein the cylindrical body is made of non-magnetic material.

8. The rotary electric machine as in claim 1, wherein:  
the resin insulator is formed by filling a liquid resin in the inner groove for insulating the cylindrical body; and  
mounting the cylindrical body after filling the liquid resin and before the liquid resin hardens.